The Training School

BULLETIN

Devoted to the Interests of those whose minds have not developed normally

Edited by

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The A Test with the Feeble Minded

During the years 1907-10 considerable work was done at the Vineland Research Laboratory with the A-test as a means of studying defective children. The work was carried on by regular students during the year, and by special students during the summer training course for teachers. Two hundred and fifty-two children were examined, with a total of 479 examinations. With the material of these examinations we have attempted an analysis of the A-test as a mental test and as a means of study in the psychology of defectives. All the cases have been examined with the Binet scale, and we have endeavored to discover what correlation, if any, exists between mental ability (as measured by the Binet scale) and performance in this test. Because there is considerable range in the chronological ages of the subjects tested, the records were studied for age and sex differences as well as for mental ability. As a measure of performance in the test it seemed fairest to use the average number of A's crossed out and the number of A's omitted (so far as the subject had been able to proceed in the time allowed) as best indicating the speed and accuracy of perception. For estimating the number of A's omitted all the uncrossed A's were counted

in those lines where one or more A's had been crossed out. In case a full line had been skipped it was not counted as all "A's" omitted. Neither were A's counted omitted in any line where it was certain that the subject had proceeded regularly, but had stopped in the middle of the line because time was up. All cases (as institution wards) had been corrected for eye defects.

The instructions to the subjects were those ordinarily given in this test. The examiner first made sure that the subject knew the letter A. He then instructed the subject to cross out all the A's that he could in two minutes, beginning at the left at the first line and proceeding just as in reading. The attitude of the examiner was sympathetic and encouraging, but no help was given after the instructions were understood. Inability to comprehend the instructions constituted a total failure. Those cases also were counted as failures where the subject crossed letters at haphazard, doubtful cases being determined by a score whose errors or omissions and errors equaled the number of A's crossed. No difficulty was experienced in determining such failures, as it always was evident from the original record whether or not the marking of the A's was purposive or haphazard. Individually a haphazard marking may be considered much better than absolute failure, but this seems to us to be more a matter of temperament than of mental ability.

In tabulating the results the individual records were arranged in order of mental age (as measured by the Binet scale), and then according to chronological age, and by sex within this classification. These groups were averaged separately and totally and the mean variations computed. The arithmetic mean was taken as a measure of central tendency, as neither median nor mode was representative. In computing the averages the failures were separated from the other records and were not averaged in the totals, being considered qualitatively rather than quantitatively different from the totals. The tabulated results follow in tables of sex and totals. The first column indicates the mental age of the subjects, the second the average chronological age with mean variation, the third the number of cases at each age, the fourth the number of tests (sometimes as many as seven or eight tests being made with one subject), the fifth column gives the average number of A's crossed out at each mental age, with m. v., and also indicates the number of failures, the sixth gives the number of A's omitted, with m. v., and the seventh gives the extremes of variability in number of A's crossed at each age. Where more than one test had been made with any one subject the average of those tests was taken as that individuals record.

TABLE I.

BOYS.

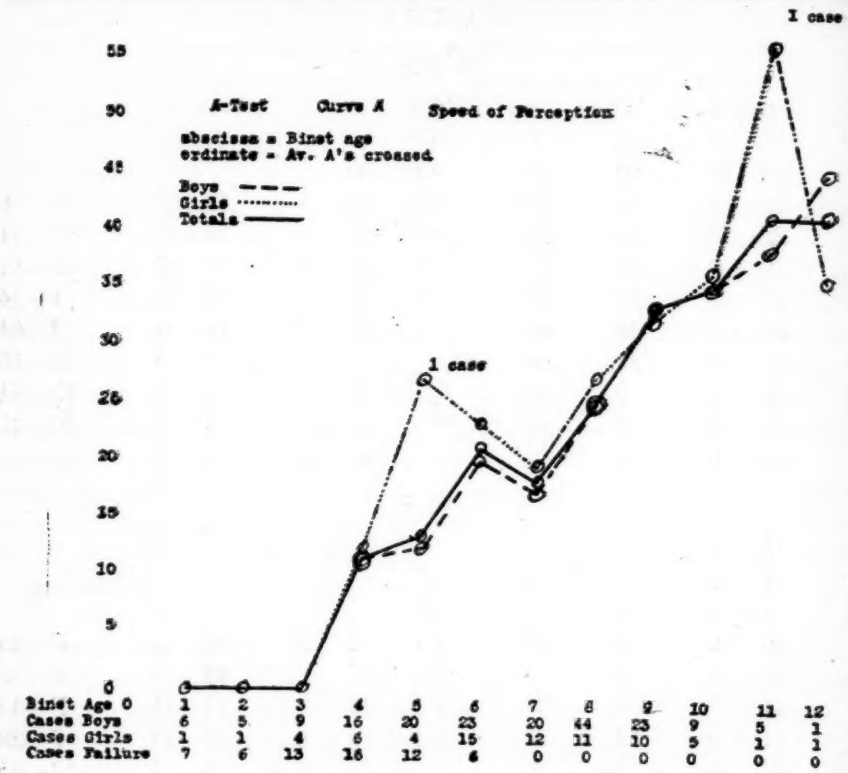
1	16	4	6	6	6 F	0				
2	17	5	5	6	6 F	0				
3	21	10	9	11	9 F	0				
4	17	3	16	24	12 F	11	4	18	15	F—16
5	22	8	20	22	9 F	12	4	18	16	F—21
6	19	9	23	34	5 F	20	9	13	12	F—51
7	18	6	20	37	0 F	17	6	18	12	4—34
8	20	5	44	89		25	7	14	14	3—64
9	18	4	23	63		33	9	8	5	16—50
10	20	5	9	20		35	10	8	8	17—51
11	19	5	5	14		38	5	4	3	30—47
12	12	0	1	4		45	0	4	0	———

GIRLS.

1	17	0	1	1	1 F					
2	12	0	1	1	1 F					
3	9	4	4	6	6 F					
4	16	6	6	13	4 F	12	2	10	9	F—13
5	16	4	4	4	3 F	27	0	48	0	F—27
6	21	7	15	27	1 F	23	8	15	11	F—43
7	21	9	12	27	0 F	19	6	16	13	7—28
8	22	6	11	20		27	8	6	5	13—45
9	25	8	10	26		32	8	11	9	15—49
10	23	5	5	14		36	6	3	1	29—44
11	13	0	1	5		56	0	2	0	———
12	23	0	1	5		37	0	3	0	———

TOTALS.

1	16	4	7	7	7 F					
2	17	5	6	7	7 F					
3	17	8	13	17	17 F					
4	17	4	22	37	16 F	11	3	15	12	F—16
5	22	8	24	26	12 F	13	5	20	15	F—27
6	20	8	38	61	6 F	21	8	14	11	F—51
7	19	8	32	64	0 F	18	6	17	12	4—34
8	20	6	55	109		25	7	12	12	3—64
9	20	5	33	89		33	9	9	6	15—50
10	21	5	14	34		35	8	6	5	17—51
11	19	4	6	19		41	15	4	2	30—56
12	18	6	2	9		41	4	4	5	37—45

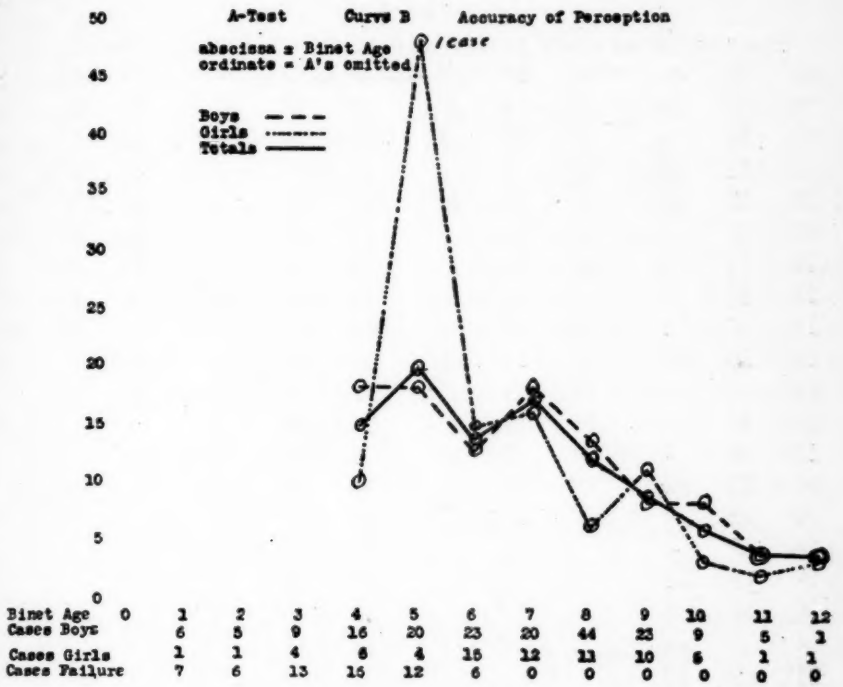


Binet Age 0	1	2	3	4	5	6	7	8	9	10	11	12
Cases Boys	6	5	9	16	20	23	20	44	23	9	5	1
Cases Girls	1	1	4	6	4	15	12	11	10	5	1	1
Cases Failure	7	6	13	16	12	6	0	0	0	0	0	0

EXPLANATION OF THE CURVES.

Curve A shows the number of A's crossed by sex and age distribution. Mental age is plotted along the horizontal axis and the average number of A's crossed is plotted along the vertical axis. The curve for girls is indicated by . . . . ., the curve for boys by - - - -, and the curve for totals by ——. Below each mental age is tabulated the number of cases, showing also the number of failures. The curve for girls is not reliable for below 6 and above 10, and even within these limits the number of cases is small. Curve B is plotted as curve A, but showing the number of A's omitted.

The curves show girls better than boys both in the A's crossed and in A's omitted at practically all ages with totals also somewhat higher than boys. These curves show total averages and not individual variations. They rather prettily show how misleading gross results may be without detailed analysis, since the increases are not at all steady by individual cases. We are unable to explain the discrepancy in the rise of the curve at six years. Individual cases and averages were examined at 5, 6, 7 and 8 years, but did not yield results which would not effect the curves at all points and maintain them in their present relations.



Binet Age	0	1	2	3	4	5	6	7	8	9	10	11	12
Cases Boys		6	5	9	16	20	23	20	44	23	9	5	1
Cases Girls		1	1	4	6	4	15	12	11	10	6	1	1
Cases Failure		7	6	13	15	12	6	0	0	0	0	0	0

CONCLUSIONS.

It is evident from an examination of the data that there is a constant increase for both sexes in the number of A's crossed out at each age, with the exception of the seventh year. There is also a fairly constant decrease in the number of A's omitted. This increase and decrease, however, is apparent only for the total averages, and will not withstand a more careful detailed analysis. Unfortunately, we cannot present all the tables for each year, but for illustration it will suffice to examine the tables for 6 years and 9 years. Here it is clear that there is a very high degree of variability, so high, indeed, that an individual 6-year case crosses more A's than any 9-year old, and at 6 years the range is all the way from total failure to 51 A's crossed. And an inspection of the other tables (not presented here) shows an individual of 4 equaling one of 9 for the same chronological age and sex (22-year-old boys), with 16 A's crossed in each case and 29 and 2, respectively, omitted. The number of A's omitted varies in the same way, a subject of 4 years crossing 13 A's and omitting 4 and one of 9 years crossing 13 and omitting 29 (also boys of 22 years). Similar variations obtain throughout a large number of cases at all ages. This is made much clearer by an examination of the last column of the table, which shows the extremes of performance at each age. These extremes of variability do not show the extremes included by all individual tests. The individual extremes are obscured in these tables by the individual averages. By individual test these extremes would be even greater.

TABLE II.

TABULATION BY INDIVIDUAL CASES AT 6 AND 9 YEARS MENTALITY.

64	F	—	54	23	29	45	37	17	39	48	1
37	16	25	28	15	27	25	17	11	38	26	8
34	14	2	27	43	18	24	44	3	32	30	0
33	22	42	26	4	18	23	16	2	29	25	0
31	12	16	26	25	23	22	32	4	22	15	19
33	18	15	24	16	0	21	26	2	20	49	43
29	14	2	20	F	—	21	29	11	19	38	3
27	10	6	19	39	40	19	50	10	18	36	15
25	17	2	19	15	1	19	44	1	17	29	16
24	36	10	17	24	1	19	38	13	14	27	7
23	F	—	15	25	7	17	38	12	0		
23	13	3	15	13	0	16	44	1			
21	39	0	14	17	18	16	28	15			
20	23	52	10	13	25	16	26	7			
19	25	9	8	26	7	16	53	15			
18	F	—				15	23	5			
18	18	32				14	26	0			
16	13	6				14	40	6			
14	F	—				14	44	7			
11	9	10				13	30	21			
11	51	0				13	29	5			
9	F	—				13	18	1			
9	9	2				13	34	11			
—	—	—	—	—	—	—	—	—	—	—	—
19	20	13	21	23	15	18	33	8	25	32	11

For a closer statistical study we computed for boys the average number of A's crossed by the upper 80% of the cases arranged in ascending order of values and then computed the percentages of cases at each age falling below the 80% average of the preceding age. This was done for ages 4 to 10 inclusive, and yielded the following table:

Mental age	4	5	6	7	8	9	10		
80% av. A's crossed	11	12	20	18	29	36	39	(25%)	(50%)
Per cent. of cases falling below preceding 80% av.	75	70	40	65	30	43	55		

This table clearly shows the deficiency of the A tests as a diagnostic mental test, since at no age do 80% of the cases or even 75% surpass the average of 80% of the cases at the preceding age.

One further evidence condemns the test as a diagnostic test, and that is the lack of correspondence in a number of examinations with the same subject. We present four cases which are typical:

Ralph	9	15	2-7-07	14	0
			8-4-08	21	7
			7-29-09	29	8
Agnes	9	22	7-30-07	23	5
			8-19-08	17	45
			6-22-10	14	6
Marjory	12	23	2-7-07	25	13
			7-22-07	61	1
			8-12-08	28	0
			3-10-10	32	0
Owen	10	18	5-20-07	30	3
			5-23-07	43	7
			2-4-08	52	16
			2-26-08	68	32
			7-21-08	56	34
			8-3-09	52	48
			6-29-10	55	45

Subject Ralph shows continued increase in A's crossed at successive years. Subject Agnes shows continued decrease at successive years. Subject Marjory shows increase and decrease with variations of 25 to 61. Subject Owen shows continued increase for three tests and then decrease with a variability of 30-68. This is four cases of fairly similar ages and for both sexes. With such extreme individual differences, the test could not be valuable as a group or diagnostic study. In these individual variations there is a rather general inverse relation between A's crossed and A's omitted. Throughout a large number of cases these four cases seem typical. There is in general, however, something of a practice increase in number of A's crossed, but this is not by any means so marked nor so constant as in the results obtained by Norsworthy with defectives at Waverly. It should also be said that this practice increase is not continued in repeated trials, there being sometimes regression and sometimes continued progression. This high individual variation may perhaps be due to the rather high personal equation that is apparent in many experiments with the feeble-minded. It may also be true that this variation is an excellent indication and measure of the abnormal variability of the defective mind or at least of the variability of the mental processes which are under examination in this experiment. It is very probable that as an individual test, the A test *does* reveal variability of defectives' ability under different conditions. But this could be accounted for in other ways, *e. g.,* Thorndike's experiments with subjects of normal mentality show that individual variation is higher than group variation, and, furthermore, Simpson's results, quoted by Thorndike in Science for Janu-

ary 24, 1913, show only 21 hundredths of perfect correspondence with general mental ability in the case of the A test with normal adults. The indication, therefore, is that the test is more valuable psychologically than diagnostically, that is to say, as indicating a state of mind rather than measuring actual ability.

Our study may be questioned concerning complications of insanity or of special types of feeble-mindedness present in our group of cases. A few of our cases do have such complications of special types, but we do not find that this particular experiment is effected by significant variations for special types. For instance, in a group of 11 Mongolians of both sexes, we find seven failures with an average of 12 for the other five cases, but the individual records fall well within the central tendencies of the groups to which they belong by mental age classification. Similarly, an examination of the cases which have complications of insanity shows no marked variation from the group as a whole.

A careful examination of the individual cases by chronological age at the various mental ages show no correlation between the number of A's crossed and chronological ages. The second column of the table shows the chronological ages, with mean variation, for each mental age. The lowest chronological age in the entire list of cases was 6, and the highest 64, with nearly all cases ranging from 12 to 28 or 30. The data shows no differences of ability for ages above and below 20 years.

The analysis for sex differences is not very valuable, being limited by the scarcity of cases above 10 and below 6. Within these limits girls show a slightly higher number of A's crossed at each age, but 9 with a superiority of from 8% to 16%, with a lower number of A's omitted, indicating on the whole a somewhat higher degree of both speed and accuracy. The fewness of cases above 9 years does not permit of attaching any value to the averages above that year.

As an interesting individual experiment in the psychology of defectives, the A-test is much more encouraging than as a diagnostic test. Very interesting observations may be made upon a child in his manner of performing the experiment. Much more can be gleaned from his method of performance than from the numerical results. Thus, for instance, his method of receiving the instructions, his method of carrying them out, his scattered efforts and rambling attention, his lack of interest and persistence or the opposite of these, his mechanics of movement and the like, all are suggestive and helpful in one's understanding of the individual. These observations, however, can be made equally profitable in mental tests yielding more reliable and more accurately measurable results.

From these considerations we conclude that the A-test with feeble-minded children shows a decidedly low correlation (the mathematical value of r was not computed) between intellectual ability and speed, and accu-

racy of perception. We have assumed that the A-test is a test of speed and accuracy of perception as is claimed for it by Norsworthy in her monograph, "Psychology of Mentally Deficient Children." Certainly with defectives this test is much more a test of attention and concentration as well as in many cases being a test of refinement of muscular co-ordination and speed of movement, than a test only of perception. It is, therefore, not so surprising that this test does not measure intellectual ability since it fails to measure the essential elements of ability.

Something should be said concerning the cases which failed entirely in the tests. We believe that these are qualitatively, rather than quantitatively, different from the other records, and therefore, they were not included in the numerical averages, but were tabulated separately. Most of these subjects did not know the letters of the alphabet, and many could not comprehend the instructions. In many cases the examiner tried to teach the subject the letter A and then proceed, but this was not successful. The failures were in all cases due to lack of mentality and not to accidental misunderstanding.

SUMMARY.

This study indicates:

1. That the A-test for defectives is not a reliable diagnostic mental test, because of the extreme variations of different subjects at the same time, or of the same subject at different times, as well as because of the lack of correspondence between the results obtained and intellectual ability.
2. That there is no relation between this test and chronological age.
3. That special types are not markedly different from the groups to which they belong by mental age classification.
4. That sex differences are not very significant, though showing a slight superiority of girls over boys.
5. That the A-test is valuable as an individual psychological experiment, but is not in this respect superior to other tests yielding more reliable objective results.

Little Francis E—— came to us wearing rompers, after a time Miss A—— thought it would be nice for him to wear short trousers and waists, so she fitted him up and sent him to look in her mirror. When Francis saw himself his joy and pride was beyond words to describe. He jumped up and down, exclaiming: "Oh, Miss A——, I am a really, truly boy now." This did not seem to quite express his feelings, and so he added: "Oh, Miss A——, I am a really, truly, *square* boy now."

Ida G., after the test was all over, admitted "That wasn't very hard, and I'm not as dumb as I look, either."

Reviews of Biochemical Literature

Amos W. Peters

On Organotherapy.

(Concluded.)

Not only the thyroid gland possesses the power of causing changes in many and distant parts of the organism. The other glands of internal secretion have similar powers, although the effects may be different. Between thyroid and hypophysis there is an analogy in the systems of organs which are affected by both, *i. e.*, the fatty tissue, the sexual function, the bony system and the psychic activities, although the manner in which the result is produced may be different. Likewise damage to thyroid and adrenals brings about similar results. *i. e.*, weakness of the digestive organs and of the circulation, perhaps also of heat production, changes in hair and skin color, also glycosuria. Less marked cases have recently been described and classed as those of pluriglandular insufficiency, which usually show a preponderance of some one glandular defect. The hypothesis of a common cause which affected all these glands presents itself, but there is also, in other cases, much evidence for the interaction of these glands upon each other. The removal of the thyroids frequently results in changes in the sexual functions as well as hypertrophy of the parathyroids and of the hypophysis Likewise the activities of the sexual system may produce effects upon the thyroid, *e g.* swelling of the thyroid during menstruation and pregnancy, and occasionally a resulting degeneration of the thyroid. Sexual impotency has resulted from damage to both thyroid and hypophysis. Removal of the thymus results in enlargement of the adrenals and castration causes the persistence of a large thymus. Female animals deprived of the thyroid had young with hypertrophied thyroids and adrenals. The adrenal hypertrophy resulted even when the mothers developed hyperthyroidism in consequence of feeding thyreoidin. Further relationships could easily be adduced. Murri says that it must be evident that organotherapy may hope for very much from the more exact determination of these interactive relations of the organs of internal secretion. The idea is then developed that organs which wholly or partially replace each other, whether in normal growth or experimentally, must have had always a similar function. The tetany which in both animals and man follows the removal of the parathyroids, can be removed, even though not permanently, by injection of thyroid extract. Thus the thyroid seems to have replaced partially at least

the failing parathyroids.

It is undoubtedly true that the products of the glands of internal secretion collect in the blood as a common recipient. The fact that the absence of the smallest organs may lead to death in a few hours leads to the conclusion that their secretions must possess very powerful chemical properties. and these substances remind us very much of the ferments. Thus the ancient idea of the qualitative composition of the blood lives on. Could it not easily be that the excess or deficiency of hormones depends upon the epithelium of the organs?

At the present time we have at our service three methods for use when one gland of internal secretion can no longer fulfil its function. These are the implantation of the same healthy gland of another organism, or the administration of the product of this gland obtained from another animal, or the production of an increased activity in another gland which is able to compensate somewhat for the originally defective gland. At this point the author enters into a detailed discussion. which we shall here omit, of the conditions of hyper- and hypothyroidism.

The subject of the sexual glands is regarded by Murri as of enormous significance for the theory of the glands of internal secretion. The significant role which the testes play in the development of both the body and the intellect is well known. But also the operation of ovariotomy which surgeons have practiced for several decades has furnished many proofs for the damage which results to the female nervous system by the removal of the ovaries. The attempt is made to remedy these conditions by the administration of ovarial preparations. but with a result that is small or practically zero. Murri suspects that this inefficiency is due to the fact that as yet we have no ovarial preparation which contains the specifically active constituents of the ovaries. What signifies it that a liquid or a powder has been won from ovarial substance? We should have to know what the ovarial hormone is and to possess the certainty that it is actually contained in the liquid or powder in question. Upon the other hand, the favorable influence which results from ovariotomy in certain diseases of the uterus; in osteomalacia, remains as yet unknown in its mechanism. These facts warn us to give our attention to the disturbances of nutrition which result from all changes in the sexual glands, although the form of such disturbance may vary. To-day it seems astonishing that during such a long time there was not even a suspicion that a great significance attached to these glands in relation to the most important physiological functions. Lubarsch called them the "regulators of metabolism." In consequence of damage to these regulators the chemistry of the organism becomes abnormal. and with alterations of the chemistry which influences everything physiological, the most important psychical qualities change also. Murri calls attention to the difficulty of this field and to the very special liability here to the sub-

stitution of deduction for observation and experiment.

In conclusion, Murri says that the doctrine of inner secretions and of hormones bore in its lap many ideas from which numerous conclusions for effective cures were derived. Few have thus far received clinical confirmation, but these few have been unquestionably brilliant. A large number still await a retesting, and it is the duty of medical research to continue their investigation with zeal.

Books and Articles on Exceptional Children

Practically everything of value published in the last few years on the problems of exceptional children and their education, both in this country and abroad, has been listed by the United States Bureau of Education in a bulletin just issued. Arthur Macdonald is the compiler of this selected bibliography of an increasingly important field of knowledge. There are about 600 titles recorded.

A conspicuous feature of this work on children is the careful attention paid to titles of books and articles in foreign languages. About one-third of the titles are French, German, Spanish, Italian, Danish, and Russian, and the brief explanatory notes in English on these foreign articles are especially useful for American teachers and investigators.

Every phase of the problem involved in the term "exceptional children," as used by modern scientists, is represented in the bibliography. Not merely backward children, but all types of children that deviate from the normal in any way; exceptionally bright children; the blind and the deaf; the wayward child; the immigrant child; boys and girls in open-air schools; juvenile criminals and their reformation; these and numerous other topics of current interest are covered in the bibliography by references to important books and articles. The brevity of the work (less than half a hundred pages) and the careful index, add materially to the value of the bulletin for those who wish to get at the up-to-date information on "exceptional children" in the most direct manner possible. The bulletin is issued as an official document by the United States Bureau of Education and is for free distribution.

Louis Bu: "Is my mind feeble or insane?" When told that he was just a nice boy and nothing wrong with him, he added: "Isn't it funny there is nothing the matter with my brain!"

Nelson S. has been rather dissatisfied lately with his work. When brought in to be tested he began shaking the weights vigorously, and I said, "Don't shake the weights; just lift them," which he replied: "I'm shaking mad anyway this morning at that launryman and laundry lady."

A Working Bibliography on Feeble Mindedness and Related Subjects

E. A. Doll

(Continued from May)

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Little Cora, a typical Mongolian with a three-year-old mentality and whose vocabulary consists of about four words, is very positive in her likes and dislikes, and always able to make Miss C. understand. Cora was always into mischief, taking off her shoes, unbuttoning the children's clothes and taking them off, etc. So it became necessary for her to be kept busy every moment of the time, and as there was so little that she was capable of doing, Miss C., after trying all kinds of things, conceived the idea of taking Cora to the supply closet and asking her if she would like to be "teacher." Cora was delighted. So Miss C. told her the names of everything and showed her just where they were kept. Miss C. kept this up for about two weeks, until she noted Cora was actually becoming helpful. To-day she knows where everything in the closet belongs and, without being told to do so, looks after the things, picking up paper, etc., and is really a little helper, where two months ago she was a constant care. Miss C. says she feels that Cora thru this training has improved more than any other child in her class.

Ellen C. said she could write her name. When given pencil she snatched off her apron quick as a wink, laid it on the table before her, and copied from it the letters which the matron had put there in indelible ink to identify her clothing.

Vineland Training School

From the April, 1913, issue of *The New England Medical Gazette:*

To the Training School at Vineland, N. J., belongs the credit of establishing the first bio-chemical laboratory in the world for the purpose of investigation of feeble-mindedness.

In so far as this school investigates and charts the lineage of these defective children, it is doing a world-wide work in calling attention to the need for such investigation. Physicians know well how the inheritance of a patient interferes with the action of a remedy; every teacher knows how the inheritance interferes with the working out of the Educator's fine theories, and if at last we are coming to generally acknowledge this, it is well for the race.

We have heard of late too much about environment; the emotional type of reformer has learned many a sad lesson through his defeats in attempts to make over. It is well that the pendulum is swinging the other way and the relentless laws of heredity are coming to the attention of the professional world. By and by it will percolate down through to the densest of the laity layers, and in consideration that a very large per cent. of our degenerates supported by the State are foreigners, its significance may at last penetrate even the brains of Congressmen.

When heredity is accepted there will be a great reduction in the money poured into our public schools, for every practical teacher knows that no small percentage of children are not only unprofited by the school curriculum, but are injured by it. What the European countries have worked out through long centuries of struggle and suffering, the present trend of scientific investigation justifies to-day. Every teacher knows that with all the training that all the Normal Schools can give her, it is the pupil himself who decides what she can or cannot teach him.

In the ministry it is the same. We harangue on the poor work that the churches do; but after all what can the preacher do with the youthful material that he has to work upon? And if sometimes he feels that he preaches to those who need it least, he must comfort himself with what the social workers are finding too true, namely, that very few in the "submerged classes" respond at all to the bounteous gifts laid out before them.

Even in matters of food and sanitation we are forced to recognize that there are children in the slums who do not die even under the worst conditions, and children in the favored classes that die even under the most favorable conditions.

A half century ago little attention was paid to feeble-minded children, and we are only now beginning to look into the matter seriously. In recent years a wave of adenoid interest has passed over our school experts and wonderful results have followed removal of said adenoids. But no one has asked, why do adenoids in "A" cause such mental stupor and not in "B?"

Two years before the British Royal Commission reported on conditions in England the school at Vineland had begun the laboratory study of feeble-mindedness. First, blanks were sent to the parents of the feeble-minded children in the institution. The information gained threw such light upon the children that systematic work was begun.